Contents available at ScienceDirect

Diabetes Research and Clinical Practice

journal homepage: www.elsevier.com/locate/diabres

International Diabetes Federation

Higher vaspin levels in subjects with obesity and type 2 diabetes mellitus: A meta-analysis

Rennan Feng [a,b], Yanchuan Li [a,b], Cheng Wang [c], Chao Luo [e], Liyan Liu [a,b], Fuchuan Chuo [a,b], Qiang Li [d,*], Changhao Sun [a,b,**]

[a] Department of Nutrition and Food Hygiene, School of Public Health, Harbin Medical University, Harbin, China
[b] National Key Discipline, School of Public Health, Harbin Medical University, Harbin, China
[c] Environmental Hygiene, School of Public Health, Harbin Medical University, Harbin, China
[d] Department of Endocrine and metabolism, Second Affiliated Hospital of Harbin Medical University, Harbin, China
[e] STD & AIDS Center, Harbin Center for Disease Control and Prevention, Harbin, China

ARTICLE INFO

Article history:
Received 26 February 2014
Received in revised form
14 May 2014
Accepted 20 July 2014
Available online 27 July 2014

Keywords:
Vaspin
Obesity
Diabetes
Meta-analysis

ABSTRACT

Aims: Visceral adipose tissue-derived serpin (vaspin) was identified as a new adipocytokine. Many studies reported vaspin concentrations in obese subjects and type 2 diabetes mellitus (T2DM) patients. However, large variation in levels of vaspin seen in different studies may be attributable to differences of sample size. The aim of this study is to establish an accurate confidence interval of vaspin levels in obese subjects and T2DM patients using a large-scale meta-analysis.

Methods: Publications of the association between vaspin and obesity and T2DM in the databases of Medline, PubMed and EMBase were collected. The keywords included "vaspin" and "visceral adipose tissue-derived serpin". Review manager 5.0 was used to process the data.

Results: For the analysis of obesity, 6 studies with 1826 participants were included in our meta-analysis; the level of vaspin was 0.52 ng/ml [95% confidence interval (CI)](0.10–0.93, $P = 0.02$) higher in obese subjects than that in non-obese healthy controls. Eleven studies with 1570 patients were included for the analysis of T2DM; the level of vaspin was 0.36 ng/ml [95%CI] (0.23–0.49, $P < 0.00001$) higher compared with that in healthy controls.

Conclusions: Significantly higher levels of serum vaspin were observed in obese subjects and T2DM patients.

1. Introduction

Adipose tissue is a highly active endocrine organ that plays critical roles in energy homeostasis through secreting bioactive molecules (adipocytokines) [1]. It interacts with central and peripheral organs such as brain, liver and skeletal muscles to function in many physical processes [2]. Several adipose tissue-derived hormones, for example leptin [3], were found to be able to improve insulin resistance, metabolic disturbance and reduce the risk of cardiovascular disease [1,4,5].

* *Corresponding author*. Tel.: +86 0451 87502801; fax: +86 0451 87502885.
** *Corresponding author at*: Department of Nutrition and Food Hygiene, School of Public Health, Harbin Medical University, Harbin, China. Tel.: +86 0451 87502801; fax: +86 0451 87502885.
E-mail addresses: liqiang_hmu@126.com (Q. Li), changhao2002sun@gmail.com (C. Sun).
http://dx.doi.org/10.1016/j.diabres.2014.07.026
0168-8227/

Previously, Hida et al. [6] demonstrated that visceral adipose tissue-derived serpin (vaspin), known as a new adipocytokine, was secreted from visceral adipose tissue. In an animal model of abdominal obesity with T2DM, it was shown to sensitize insulin that targeted on white adipose tissues in obese rats. They also found the expression of vaspin was tissue-specific that the highest level was observed in white adipose tissues. Noticeably, its tissue serum levels showed an increase trend with prediabetic stage, but decreased in diabetes upgrade development along with a sharp body weight loss. In addition, the study showed that further administration of vaspin could help to improve glucose tolerance and insulin sensitivity of obese mice [6]. Convincing evidence indicated that vaspin may also ameliorate atherosclerosis by protecting against the damage of vascular endothelial cells through the mediation of PI-3 kinase/Akt pathway [7].

Recently, Youn et al. [8] investigated the relationship between circulating vaspin and obesity related factors (i.e., BMI and insulin sensitivity). Strong correlations were found for circulating vaspin and BMI and insulin sensitivity. Moreover, the study showed that vaspin levels were increased dramatically after 4 weeks' physical training. Derosa et al. [9] and Cho et al. [10] reported higher serum vaspin levels in obese subjects compared with those were lean or having normal weight. However, the result could not be replicated by Jeong et al. [11]. The association was inconclusive for T2DM patients as well. Teshigawara et al. [12] declared that vaspin levels in T2DM patients were significantly higher than levels in healthy controls. A similar result was observed by Zhang et al. [13], but not all [8,14–16].

Therefore, meta-analysis is needed to evaluate the associations between levels of vaspin and obesity and T2DM.

2. Methods

2.1. *Study selection*

We searched several databases (Medline, PubMed and EMBase) to obtain published articles that are relevant to our study through January, 2014. We used 'vaspin' or 'visceral adipose tissue-derived serpin' as keywords to search for articles relevant to obesity and T2DM. In addition, we also examined references of received articles. Studies that meet all the following criteria will be included in meta-analysis: (1) the study investigated the association between vaspin and obesity or T2DM and (2) cross-sectional study or case control study of the diseases; (3) at least two groups (obese or diabetic group vs. control group) involved in a single study and (4) the controls in both groups were checked for their eligibility [normal BMI ($<30\ kg/m^2$) for analysis of obesity; normal glucose tolerance as fasting blood glucose < 6.1 mmol/l and 2 h-postload blood glucose < 7.8 mmol/l for analysis of T2DM]. Exclusion criteria were: (1) review articles, letters and meeting abstracts and (2) studies regarding children, adolescents or pregnant women. A flow chart of the searching

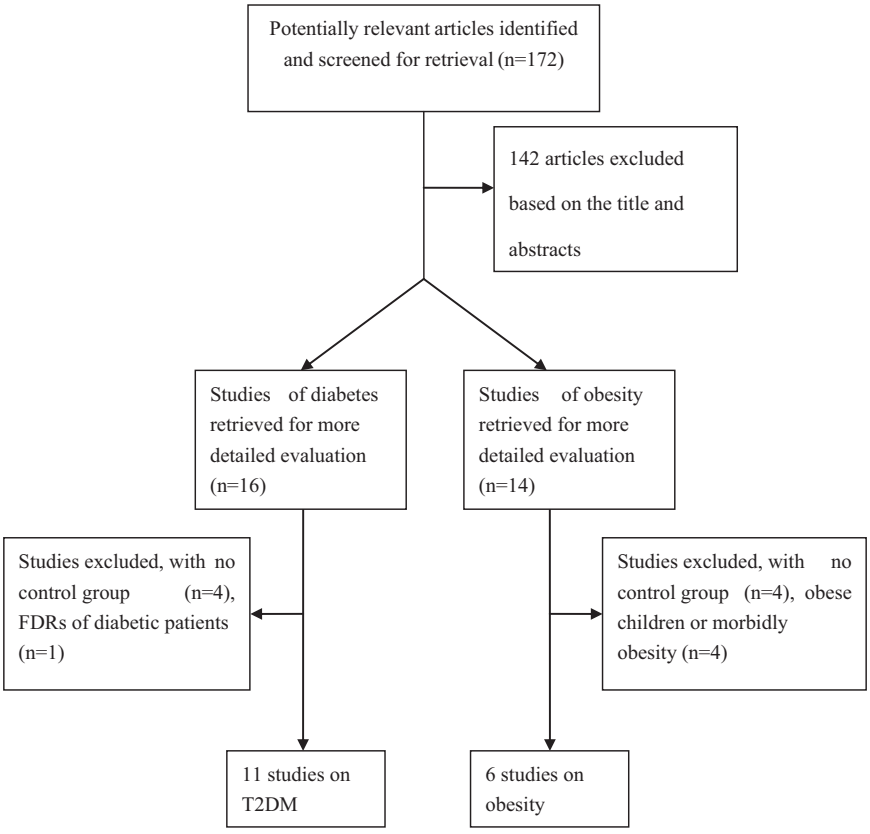

Fig. 1 – Flow chart of current study.